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10/628,380	07/29/2003	Dong Han Seo	LT-0037	4334

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EXAMINER	
TRAN, CON P	
ART UNIT	PAPER NUMBER
2614	
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11/14/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/628,380	SEO ET AL.	
	Examiner	Art Unit	
	CON P. TRAN	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5-8,10-14,16,18,19,27 and 29-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27,29 and 30* is/are allowed.

6)☒ Claim(s) *5, 11, 13, 14, 16, 18, 19, 31-36* is/are rejected.

7)☒ Claim(s) *6-8,10 and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/23/08 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 5, 31, 32-33, and 36** are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Brien U.S. Patent 6,429,737 (hereinafter, "O'Brien' 737") in view of Rosback U.S. Patent 4,641,361.

Regarding **claim 5**, O'Brien' 737 teaches a multi-channel PWM (Pulse Width Modulator) apparatus (see col. 3, line 63 – col. 4, line 9; see Figs. 1, 7, and respective portions of the specification), comprising:

a plurality of pulse width modulators (PWM 119, Figs. 1, 7) for modulating audio signals (112, 70, 71, Figs. 1, 7) into PWM-based multi-channel audio signals (outputs of PWMs; col. 3, lines 8-15; col. 5, lines 39-48); and

a gain control unit (volume control 114, Fig. 1) connected to the plurality of pulse width modulator (119, Fig. 1; PWM, Fig. 7) for control gains of the audio signals received at the plurality of pulse width modulators, wherein the gain control unit independently controls gains of at least a portion (i.e., the whole signal) of the audio signals according to individual channels (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls).

However, O'Brien' 737 does not explicitly disclose wherein the gain control independently control gains to be at different levels, the gain control unit controlling gains of at least the portion of the audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the gain of the other audio signals.

Rosback discloses a multiple band automatic gain control (AGC) circuit (10, Fig. 1) in which each frequency component is processed in a separate gain adjustment circuit (i.e., as a function of magnitude of the signal at the output of band splitter; col. 2, lines 25-45), when the gains in the high and low band are within a selected amount, the gain control unit controlling gains of at least the portion of the audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the

gain of the other audio signals (see col. 3, lines 11-16; col. 5, line 66 – col. 6, line 21; i.e., when the wiper arm of potentiometer 156, Fig. 3 is not in the extreme right or extreme left).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the automatic gain control (AGC) circuit taught by Rosback with the multi-channel PWM apparatus of O'Brien' 737 wherein the gain control independently control gains to be at different levels, the gain control unit controlling gains of at least the portion of the audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the gain of the other audio signals as claimed for purpose of providing the circuit response characteristics in the individual bands can be simultaneously controlled as suggested by Rosback in column 1, lines 49-50.

Regarding **claim 31**, O'Brien' 737 in view of Rosback teaches the apparatus as set forth in claim 5. O'Brien' 737 in view of Rosback, as modified, further teaches wherein the gain control unit includes a plurality of gain controllers (VGA 16, 18, 20, Fig. 1, see Rosback, col. 2, lines 39-51), each independently controlling a gain of audio signals (i.e., as a function of magnitude of the signal at the output of band splitter; col. 2, lines 25-45) received at a respective one of the pulse width modulators (119, Fig. 1; PWM, Fig. 7; see O'Brien' 737).

Regarding **claim 32**, O'Brien' 737 in view of Rosback teaches the apparatus as set forth in claim 5. O'Brien' 737 in view of Rosback, as modified, further teaches wherein the gain control unit (AGC circuit 10, Fig. 1; see Rosback) independently controls a first number of the audio signals to be at a first level and a second number of the audio signals to be at a second level (i.e., as a function of magnitude of the signal at the output of band splitter; col. 2, lines 25-45; independent, nonuniform, col. 3, lines 7-11).

Regarding **claim 33**, O'Brien' 737 in view of Rosback teaches the apparatus as set forth in claim 32. O'Brien' 737 in view of Rosback, as modified, further teaches wherein the first number is greater than one and the second number is greater than one (i.e., as a function of magnitude of the signal at the output of band splitter; col. 2, lines 25-45; independent, nonuniform, col. 3, lines 7-11).

Regarding **claim 36**, O'Brien' 737 in view of Rosback teaches the apparatus as set forth in claim 5. O'Brien' 737 as modified, teaches further comprising a controller to independently control phases of the audio signals, wherein the second controller adjusts phases of at least a portion of the audio signals to be different (delay timing control 120 for each PWM 119, Figs. 1, 4-8; col. 3, lines 16-22, col. 5, lines 16-48).

3. **Claims 13-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. U.S. Patent 7,047,325 (hereinafter, "Kondo") in view of O'Brien U.S. Patent

6,429,737 (hereinafter, "O'Brien' 737"), and further in view of Rosback U.S. Patent 4,641,361.

Regarding **claim 13**, Kondo teaches an audio/visual receiver (DVD, VCR, tuner, monitor; col. 7, lines 49-56; see Figs. 18, 22, 38, and respective portions of the specification), comprising:

a reader (DVD player 96A, Fig. 38) configured to output a first data signal based on information stored in a recording medium (col. 42, lines 13-21);

a tuner (61, Fig. 18) configured to output a second data signal (col. 27, lines 34-40);

a decoder (81, Fig. 22) coupled to the reader configured to decode the data signals into audio signals (col. 31, lines 9-18);

at least one speaker (306, Fig. 42) configured to receive and output the PWM-based multi-channel audio signals (see col. 44, lines 45-51).

However, Kondo does not explicitly disclose a pulse width modulator device configured to modulate the audio signals into PWM-based multi-channel audio signals that comprises, a plurality of pulse width modulators configured to modulate the audio signals into the PWM-based multi-channel audio signals; and a plurality of signal controllers coupled to the plurality of modulators to independently control at least one of input signals and output signals of the plurality of pulse width modulators.

O'Brien' 737 teaches a pulse width modulator device configured to modulate the audio signals into PWM-based multi-channel audio signals (see col. 3, line 63 – col. 4, line 9; see Figs. 1, 7, and respective portions of the specification), that comprising:

a plurality of pulse width modulation means (PWM 119, Figs. 1, 7) for modulating audio signals (112, 70, 71, Figs. 1, 7) into PWM-based multi-channel audio signals (outputs of PWMs; col. 3, lines 8-15; col. 5, lines 39-48); and

a plurality of signal controllers (via volume control 114, Fig. 1) coupled to the plurality of modulators to independently control at least one of input signals and output signals of the plurality of pulse width modulators (col. 2, lines 8-39), wherein the plurality of signal controllers comprise a plurality of gain controllers (via volume control 114, Fig. 1) that each receive one of the audio signals received for a corresponding one of the plurality of pulse width modulators (PWM 119, see Figs. 1, 7), wherein the gain controllers independently control gains of the received audio signals according to individual channels (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a pulse width modulator of O'Brien' 737 device teaching with an audio/visual receiver of Kondo to obtain a an audio/visual receiver as claimed for purpose of reducing or eliminating noise that leak from one channel to another, as suggested by O'Brien' 737 in column 4, lines 63-67.

However, Kondo in view of O'Brien' 737 does not explicitly disclose wherein the gain control independently control gains to be at different levels, the gain control unit

controlling gains of at least the portion of the received audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the gain of the other received audio signals.

Rosback discloses a multiple band automatic gain control (AGC) circuit (10, Fig. 1) in which each frequency component is processed in a separate gain adjustment circuit (i.e., as a function of magnitude of the signal at the output of band splitter; col. 2, lines 25-45), when the gains in the high and low band are within a selected amount, the gain control unit controlling gains of at least the portion of the received audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the gain of the other received audio signals (see col. 3, lines 11-16; col. 5, line 66 – col. 6, line 21; i.e., when the wiper arm of potentiometer 156, Fig. 3 is not in the extreme right or extreme left).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the automatic gain control (AGC) circuit taught by Rosback with the audio/visual receiver of Kondo in view of O'Brien' 737 wherein the gain control independently control gains to be at different levels, the gain control unit controlling gains of at least the portion of the received audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the gain of the other received audio signals as claimed for purpose of providing the circuit response characteristics in the individual bands can be simultaneously controlled as suggested by Rosback in column 1, lines 49-50.

Regarding **claim 14**, O'Brien' 737, as modified, further teaches wherein the plurality of signal controllers comprise a plurality of phase shifters that phase-shift modulated output signals received from the pulse width modulators (delay timing control 120 for each PWM 119, Figs. 1, 7; col. 3, lines 16-22).

4. **Claims 16 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. U.S. Patent 7,047 (hereinafter, "Kondo") in view of O'Brien U.S. Patent 6,429,737 (hereinafter, "O'Brien' 737"), in view of Rosback U.S. Patent 4,641,361and further in view of Beard U.S. Patent 5,796,359.

Regarding **claim 16**, Kondo in view of O'Brien in view of Rosback teaches the receiver of claim 14.

However, Kondo in view of O'Brien in view of Rosback does not explicitly disclose wherein the plurality of signal controllers comprising a plurality of controllers that independently enable the plurality of pulse width modulators according to individual channels.

Beard discloses a data conversion system (10, 50, Figs. 1, 2) having pulse width modulation (24) in which the control circuitry (40) selectively disables the pulse-width modulator (24, col. 2, lines 45-52; col. 5, lines 41-48; col. 6, lines 30-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a control circuitry of Beard teaching with a receiver of Kondo in view of O'Brien' 737 in view of Rosback to obtain a control means

for independently turning on/off the plurality of pulse width modulation means according to individual channels as claimed for purpose of providing a lower costs solution to data conversion and data processing than was otherwise available, as suggested by Beard in column 2, lines 43-45.

Regarding **claim 18,** this claim has similar limitations as Claim 16. Therefore it is interpreted and rejected for the reasons set forth in the rejection of Claim 16.

5. **Claims 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over O'Brien U.S. Patent 6,429,737 (hereinafter, "O'Brien' 737") in view of Rosback U.S. Patent 4,641,361, and further in view of Beard U.S. Patent 5,796,359.

Regarding **claim 19**, O'Brien' 737 teaches a multi-channel PWM (Pulse Width Modulator) apparatus (see col. 3, line 63 – col. 4, line 9; see Figs. 1, 7, and respective portions of the specification), comprising:

a plurality of pulse width modulators (PWM 119, Figs. 1, 7) configured to modulate audio signals (112, 70, 71, Figs. 1, 7) into PWM-based multi-channel audio signals (outputs of PWMs; col. 3, lines 8-15; col. 5, lines 39-48); and

a plurality of signal controllers (via volume control 114, Fig. 1) coupled to the plurality of modulators for controlling at least one of input signals and output signals of the plurality of pulse width modulators (col. 2, lines 8-39), wherein the plurality of signal controllers comprise a plurality of phase shifting means for phase shifter

modulated output signals received from the pulse width modulation (delay timing control 120 for each PWM 119, Figs. 1, 7; col. 3, lines 16-22),

wherein the plurality of signal controller comprise a plurality of gain controllers (i.e., controller, via volume control 114, Fig. 1) for receiving the audio signals received at the plurality of pulse width modulators (PWM 119, see Figs. 1, 7), wherein the gain controller independently controls gains of at least a portion (i.e., the whole signal) of the received audio signals according to individual channels of the pulse width modulators (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls), and

wherein the plurality of signal controllers comprise a plurality of controllers for independently control the plurality of pulse width modulators according to said individual channels, while audio signals are being received at said PWM apparatus (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls).

However, O'Brien' 737 does not explicitly disclose wherein the gain controllers independently control gains of the received audio signal to be different, the gain control unit controlling gains of at least the portion of the received audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the gain of the other received audio signals.

Rosback discloses a multiple band automatic gain control (AGC) circuit (10, Fig. 1) in which each frequency component is processed in a separate gain adjustment circuit (i.e., as a function of magnitude of the signal at the output of band splitter; col. 2,

lines 25-45), when the gains in the high and low band are within a selected amount, the gain control unit controlling gains of at least the portion of the received audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the gain of the other received audio signals (see col. 3, lines 11-16; col. 5, line 66 – col. 6, line 21; i.e., when the wiper arm of potentiometer 156, Fig. 3 is not in the extreme right or extreme left).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the automatic gain control (AGC) circuit taught by Rosback with the multi-channel PWM apparatus of O'Brien' 737 wherein the gain controllers independently control gains of the received audio signal to be different, the gain control unit controlling gains of at least the portion of the received audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the gain of the other received audio signals as claimed for purpose of providing the circuit response characteristics in the individual bands can be simultaneously controlled as suggested by Rosback in column 1, lines 49-50.

However, O'Brien' 737 in view of Rosback does not explicitly disclose wherein a plurality of controllers for independently turning on/off the plurality of pulse width modulation means according to individual channels.

Beard discloses a data conversion system (10, 50, Figs. 1, 2) having pulse width modulation (24) in which the control circuitry (40) selectively disables the pulse-width modulator (24, col. 2, lines 45-52; col. 5, lines 41-48; col. 6, lines 30-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a control circuitry of Beard teaching with an apparatus of O'Brien' 737 in view of Rosback to obtain a plurality of controllers for independently turning on/off the plurality of pulse width modulation means according to individual channels as claimed for purpose of providing a lower costs solution to data conversion and data processing than was otherwise available, as suggested by Beard in column 2, lines 43-45.

6. **Claims 11, 34-35** are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Brien U.S. Patent 6,429,737 (hereinafter, "O'Brien' 737") in view of Rosback U.S. Patent 4,641,361, and further in view of Yoshida U.S. Patent 4,173,739.

Regarding **claim 11**, O'Brien' 737 in view of Rosback teaches the apparatus as set forth in claim 5. However, O'Brien' 737 in view of Rosback does not explicitly disclose further comprising: a controller for independently turning on/off the plurality of pulse width modulators according the individual channels.

Yoshida discloses an overload detecting circuit for a PWM amplifier, which includes a DC voltage source having a pair of terminals; first and second switching elements connected in series between the terminals of the DC voltage source; a signal input circuit for ON/OFF controlling the first and second switching elements (col. 1, lines 7-11; col. 2, lines 3-9).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the overload detecting circuit for a PWM amplifier taught by Yoshida with an apparatus of O'Brien' 737 in view of Rosback to obtain a controller for independently turning on/off the plurality of pulse width modulators according the individual channels as claimed for purpose of decreasing the generation of heat in the switching element, as suggested by Yoshida in column 1, lines 64-65.

Regarding **claim 34**, O'Brien' 737 in view of Rosback teaches the apparatus as set forth in claim 5. However, O'Brien' 737 in view of Rosback does not explicitly disclose further comprising: a controller to selectively turn off one or more of the pulse width modulators when a predetermined condition is detected.

Yoshida discloses an overload detecting circuit for a PWM amplifier, which includes a DC voltage source having a pair of terminals; first and second switching elements connected in series between the terminals of the DC voltage source; a signal input circuit for ON/OFF controlling the first and second switching elements (col. 1, lines 7-11; col. 2, lines 3-9).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the overload detecting circuit for a PWM amplifier taught by Yoshida with an apparatus of O'Brien' 737 in view of Rosback to obtain a controller to selectively turn off one or more of the pulse width modulators when a predetermined condition is detected as claimed for purpose of decreasing the

generation of heat in the switching element, as suggested by Yoshida in column 1, lines 64-65.

Regarding **claim 35**, O'Brien' 737 in view of Rosback, and further in view of Yoshida teaches wherein the predetermined condition is an overload condition (col. 1, lines 7-11; col. 2, lines 3-9).

Response to Arguments

7. With respect to objection to the claim, the claim 27 has been amended. Accordingly, the objection is removed.

8 Applicant's arguments filed January 28, 2008 have been fully considered but they are not persuasive.

9 Applicant's arguments that Rosback discloses that compression control and gain control are independent of one another; this column does not disclose that control of the gains in each of the three bands is independent of one another.

Examiner respectfully disagrees. As presented tin the Office Action, Rosback teaches when the gains in the high and low band are within a selected amount, the gain control unit controlling gains of at least the portion of the audio signals so that control of the gain of each of the portion of audio signals is not limited by control of the gain of the

other audio signals (see col. 3, lines 11-16; col. 5, line 66 – col. 6, line 21; i.e., when the wiper arm of potentiometer 156, Fig. 3 is not in the extreme right or extreme left).

Allowable Subject Matter

10 **Claims 6 and 12** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11 **Claims 7, 8 and 10** would be allowable if claim 6 overcame the objections, set forth in this Office action.

12 **Claim 27** is allowable.

13 **Claims 29 and 30** are allowable by virtue of their dependency on claim 27.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CON P. TRAN whose telephone number is (571)272-7532. The examiner can normally be reached on M - F (08:30 AM - 05:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor VIVIAN C. CHIN can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/CPT/
November 15, 2008

/Vivian Chin/

Supervisory Patent Examiner, Art Unit 2614